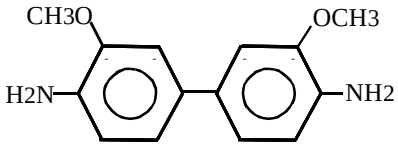
## 3,3'-DIMETHOXYBENZIDINE

3,3'-Dimethoxybenzidine is a federal hazardous air pollutant and was identified as a toxic air contaminant in April 1993 under AB 2728.

CAS Registry Number: 119-90-4

Molecular Formula: $C_{14}H_{16}N_2O_2$




3,3'-Dimethoxybenzidine occurs as colorless crystals which turn violet upon standing. It is virtually insoluble in water, soluble in acetone and chloroform, and probably soluble in most organic solvents (e.g. ethanol, ether, benzene) (NTP, 1991; Merck, 1983).

**Physical Properties of 3,3'-Dimethoxybenzidine**

Synonyms: dianisidine; 3,3'-dimethoxy-[1,1'-biphenyl]-4,4'-diamine; 3,3'-dimethoxy-4,4-'diaminobiphenyl; diaminodimethoxydiphenyl

| | |
|---|---|
| Molecular Weight: | 244.28 |
| Melting Point: | 137 - 138 °C |
| Flash Point: | 206 °C (403 °F) |
| Vapor Density: | 8.43 (air = 1) |
| Log Octanol/Water Partition Coefficient: | 1.808 |
| Conversion Factor: | 1 ppm = 9.99 mg/m$^3$ |

(HSDB, 1991; Merck, 1983; Sax, 1989; U.S. EPA, 1994a)

### SOURCES AND EMISSIONS

A. Sources

3,3'-Dimethoxybenzidine is used as an intermediate in the manufacture of azo dyes and o-dianisidine diisocyanate (NTP, 1994a).

B. Emissions

No emissions of 3,3'-dimethoxybenzidine from stationary sources in California were reported, based on data obtained from the Air Toxics “Hot Spots” Program (AB 2588) (ARB, 1997b).

C. Natural Occurrence

3,3'-Dimethoxybenzidine has not been reported to occur in nature (HSDB, 1991).

## AMBIENT CONCENTRATIONS

No Air Resources Board data exist for ambient measurements of 3,3'-dimethoxybenzidine.

## INDOOR SOURCES AND CONCENTRATIONS

No information about the indoor sources and concentrations of 3,3'-dimethoxybenzidine was found in the readily-available literature.

## ATMOSPHERIC PERSISTENCE

Gaseous 3,3'-dimethoxybenzidine in the atmosphere may be subject to direct photolysis. The estimated half-life due to its gas-phase reaction with photochemically produced hydroxyl radicals is about 2 hours (Atkinson, 1995).

## AB 2588 RISK ASSESSMENT INFORMATION

3,3'-Dimethoxybenzidine emissions are not reported from stationary sources in California under the AB 2588 program. It is also not listed in the California Air Pollution Control Officers Association Air Toxics “Hot Spots” Program Revised 1992 Risk Assessment Guidelines as having health values (cancer or non-cancer) for use in risk assessments (CAPCOA, 1993).

## HEALTH EFFECTS

Probable routes of human exposure to 3,3'-dimethoxybenzidine are inhalation and dermal contact (HSDB, 1991).

Non-Cancer: Animal tests have shown 3,3'-dimethoxybenzidine is moderately toxic after acute oral exposure. Effects reported from chronic exposure via gavage in animal studies include adverse effects on the liver, kidneys, and bladder, as well as gastritis, intestinal hemorrhage, and weight loss. 3,3'-Dimethoxybenzidine can also cause skin irritation (U.S. EPA, 1994a).

The United States Environmental Protection Agency (U.S. EPA) has not established a Reference Concentration (RfC) or an oral Reference Dose (RfD) for 3,3'-dimethoxybenzidine (U.S. EPA, 1994a).

No information is available on adverse reproductive or developmental effects of 3,3'-dimethoxybenzidine in humans or animals (HSDB, 1991; U.S. EPA, 1994a).

Cancer: No information is available on the carcinogenic effects of 3,3'-dimethoxybenzidine in humans. Animals exposed orally to 3,3'-dimethoxybenzidine developed an increased incidence of tumors of the mammary gland, ovary, bladder, intestine, skin, and stomach. The U.S. EPA has placed 3,3'-dimethoxybenzidine in Group B2: Probable human carcinogen based on sufficient animal but no human evidence (U.S. EPA, 1994a). The International Agency for Research on Cancer has placed 3,3'-dimethoxybenzidine in Group 2B: Possible human carcinogen (IARC, 1987a). The State of California under Proposition 65 has determined that 3,3'-dimethoxybenzidine (ortho-dianisidine) is a carcinogen (CCR, 1996).